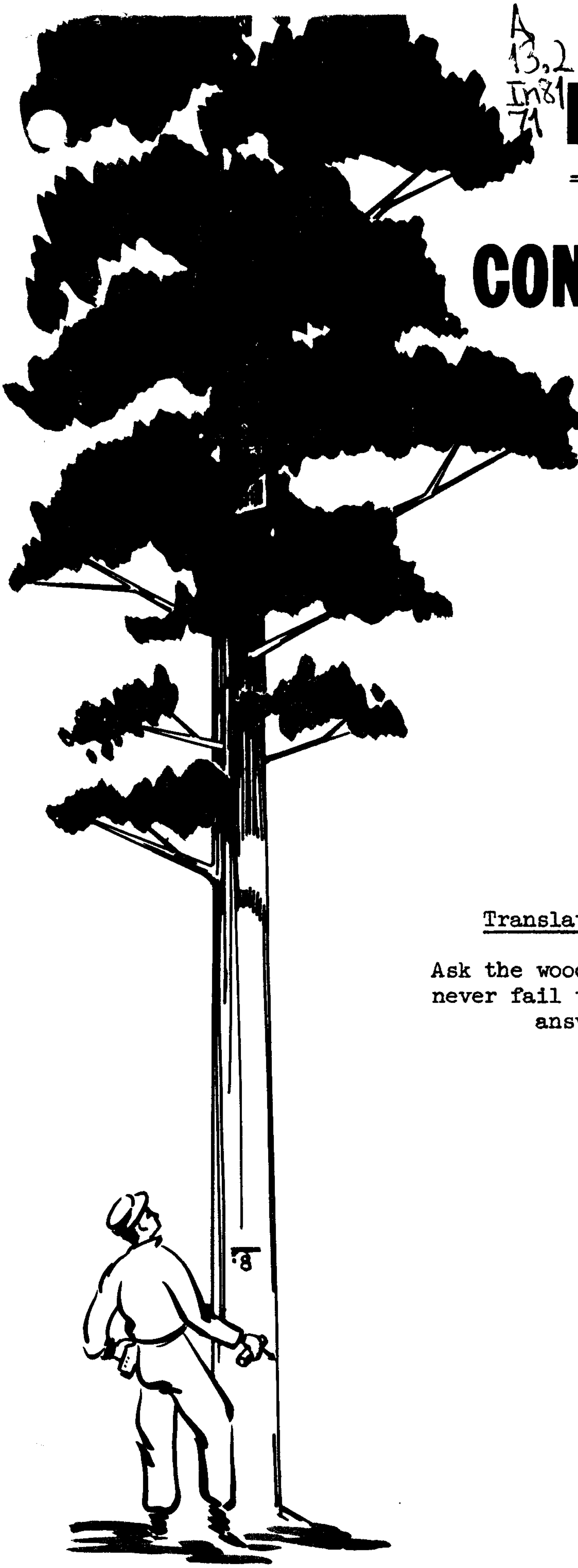
FOREST CONTROL *by* CONTINUOUS INVENTORY

"Today I have grown taller from walking
with the trees."
...Karle Wilson

Milwaukee, Wis. February, 1960 No. 71



Fraget den Wald, und ere wird euch
die Antwort nicht shuldig bleiben

Heinrich Von Cotta
1830

Translation

Ask the woods and it will
never fail to give you an
answer

CAL STOTT The Forester

PRACTICAL FIELD GUIDES TO TRUE TREE LENGTHS

Taking the usable length of trees is not simply a matter of looking up into the crown and judging the point at which the piece cutter is most likely to cut off the top. This poor weak organ, the eye, is much too fallible for such procedures. Flash estimates of tree lengths are not good enough for permanent plot work and the CFI system. Neither is it sufficient to take the length of standing trees with the hypsometer or the measuring pole. Both are fine aids to accuracy but they do little to solve the twin mysteries of flexible top diameters and variable utilization standards.

It has often been said that the cruiser who carries a normal tree taper curve in his head is best qualified to judge the true lengths of pulpwood and sawlog timber. In lieu of this anatomical convenience, we have prepared tree taper guides in pocket size. These may be carried afield in the copious pouches of the timber cruiser's apron until they come to be stored in the less copious, but more convenient pouches of the mind.

TAKING THE LENGTH OF PULPWOOD TREES

In the Lake States much of the timber is pulpwood between 5" and 13" in diameter, growing on many different sites. The cruiser has become adept at classifying the broad sites of his sample plots but he is not nearly so well trained in the consistent correlation of site and tree height. He must make a more conscious effort in this direction. To encourage this we offer the 3-4-5-6 rule explained in the first attachment, "A Simple Guide to the Usable Lengths of Trees".

At the very beginning of the measurements in each sample plot we suggest that the cruiser determine both the site and the DBH length multiplier for the pulpwood trees. With this to guide him as the individual trees are carefully measured, we are confident better length decisions will be made. The dangerous, consistent length errors will no longer occur and the work of many cruisers on many different sample plots will begin to show uniformly high standards of accuracy.

TAKING THE LENGTH OF SAWLOG TREES

The task of deciding the usable length of sawlog trees in the forest is not difficult for large trees with tops fixed by crook or crotch. It is difficult for small or medium-sized trees which are tall, straight, and clean, with top diameters far above the reach of measuring tools. Accuracy in length for this kind of tree depends upon a sound knowledge of the Girard Form class and a good understanding of normal tree taper. With these two aids to judgment the cruiser's estimates of usable length will have a consistent accuracy. Without them there is apt to be chaos.

To help the cruiser judge top diameters of sawlog trees, a table of taper values entitled "A Guide to the Top Diameters of Logs in Standing Sawlog Trees" has been prepared. It shows the top diameters of sawlog trees in Girard Form Classes 79, 75, and 70. It is well to refer to this table until its values have become second nature. Used with due allowance for straightness and the variable bark thickness of trees, the tabular material is sure to be helpful. It will reduce usable length errors and differences between cruisers, and between repeated inventories made from identical samples.

CAL STOTT
U. S. Forest Service

2/29/60

STATISTICAL PROCEDURE LEAFLET NO. 3

There are many ways to calculate the standard deviation.1/ By far the least complicated method uses only the number of individual records and values of the records themselves. There is no need to calculate an arithmetic average, (mean) or the deviations of individual records from the average.

We need only consider these few symbols:

σ = the standard deviation
N = the number of records
X = each record
Σ = the sum of

The Formula:

$$\sigma^2 = \frac{N(\Sigma X^2) - (\Sigma X)^2}{N(N-1)}$$

Example:

Plot total cords X	Cords squared X^2
1.013	1.026169
2.912	8.479744
2.011	4.044121
3.242	10.510564
4.150	17.222500
3.456	11.943936
2.486	6.180196
2.461	6.056521
5.201	27.050401
3.307	10.936249
4.317	18.636489
3.123	9.753129
ΣX = 37.679	ΣX^2 = 131.840019

$(\Sigma X)^2$ = 1419.707041

$$\sigma^2 = \frac{12\,(131.840019)-(1419.707041)}{12\,(12-1)}$$

$$\sigma^2 = \frac{1582.080228 - 1419.707041}{12\,(11)}$$

$$\sigma^2 = \frac{162.373187}{132} \text{ or } 1.230100$$

$$\sigma = \sqrt{1.230100} \text{ or } \pm 1.109 \text{ cords}$$

Computed results indicate a standard deviation of 1.109 cords. Since 3.140 cords is the average of all plot records, this means that if additional plot records are taken, two-thirds of them would be expected to fall within one standard deviation of 3.140 cords; or within the range of 4.249 cords, (3.140 + 1.109) and 2.031 cords (3.140 - 1.109).

1/ See FOREST CONTROL BY CONTINUOUS INVENTORY No. 32, November, 1956, and No. 34, January, 1957. These newsletters concern the principles of statistics and the statistical check.

William Warren Barton
Forester
U.S.F.S., Region 7